

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF CLAIMS:**

Claims 1-5 (Cancelled)

6. (Currently Amended) A method for monitoring a reciprocating compressor, comprising:

reading from sensors, associated with the reciprocating compressor, data corresponding to measured parameters relating to an operating state of the reciprocating compressor;

reading manually entered data corresponding to manually entered parameters relating to the operating state of the reciprocating compressor;

reading from a first database reference parameters relating to the operating state of the reciprocating compressor;

reading operating parameters of the reciprocating compressor that are calculated by a design program;

performing a first comparison by analyzing the reference parameters with respect to between the measured parameters, the manually entered parameters, ~~the reference parameters and~~ the operating parameters;

performing a second comparison by analyzing the reference parameters with respect to between the measured parameters, and the manually entered parameters and the reference parameters stored in the first database;

detecting whether an anomaly exists based on results of the first and second comparisons; and

if an anomaly is detected in the first and second comparisons, performing a search in a second database to find a match of previously stored data correlated with predetermined anomalies and corresponding characteristics of the predetermined anomalies, and sending a signal according to the match, the signal indicating characteristics of the detected anomaly of the operating state of the reciprocating compressor,

wherein the measured parameters and the manually entered parameters related to the operating state of the reciprocating compressor include one or more of an intake pressure of a first stage of the reciprocating compressor, an intake temperature of each stage of the reciprocating compressor, a delivery pressure of a last stage of the reciprocating compressor, a composition of the gas, an ambient pressure of the reciprocating compressor, a speed of rotation of the reciprocating compressor, and a temperature of a cooling fluid at an inlet and an outlet of the reciprocating compressor cylinders, and

wherein the operating parameters include one or more of a gas flow rate, a delivery pressure of each stage except the last stage of the reciprocating compressor, a delivery temperature at each stage of the reciprocating compressor, a power

consumption of the reciprocating compressor and forces acting on the reciprocating compressor and the operating parameters are calculated by the design program based on the measured parameters and the manually entered parameters related to the operating state of the reciprocating compressor.

7. (Previously Presented) The method of claim 6, further comprising:  
obtaining data from design specifications of the reciprocating compressor; and  
performing a third comparison between the data from the design specifications and the data measured by the sensors to determine whether there is design conformity with the design specifications.

8. (Previously Presented) The method of claim 7, further comprising:  
receiving the results of the third comparison as inputs for the design program for the reciprocating compressor, wherein outputs of the design program comprises the operating parameters.

9. (Previously Presented) The method of claim 6, wherein the second database comprises a matrix in which each row represents values of the parameters relating to the operating state of the reciprocating compressor associated with a specific anomaly.

10. (Currently Amended) A system for monitoring a reciprocating compressor,

comprising:

one or more sensors associated with the reciprocating compressor;

a measuring unit configured to read data from the one or more sensors corresponding to measured parameters relating to an operating state of the reciprocating compressor; and

a processing unit coupled to the measuring unit, the processing unit configured to receive the data corresponding to the measured parameters from the measuring unit, reference parameters from a first database, manually entered data corresponding to manually entered parameters, and operating parameters from a design program,

wherein the processing unit is configured to perform a first comparison ~~between~~ by analyzing the reference parameters with respect to the measured parameters, the manually entered parameters, ~~the reference parameters,~~ and the operating parameters, and to perform a second comparison by analyzing the reference parameters with respect to ~~between~~ the measured parameters, and the manually entered parameters ~~and the reference parameters stored in the first database,~~

wherein the processing unit is configured to detect an anomaly based on results of the first and second comparisons, and to perform a search in a second database to find a match of previously stored data correlated with predetermined anomalies and corresponding characteristics of the predetermined anomalies if an anomaly is detected in the first and second comparisons,

wherein the processing unit is configured to send a signal according to the match, the signal indicating characteristics of the detected anomaly of the operating

state of the reciprocating compressor,

wherein the measured parameters and the manually entered parameters related to the operating state of the reciprocating compressor include one or more of an intake pressure of a first stage of the reciprocating compressor, an intake temperature of each stage of the reciprocating compressor, a delivery pressure of a last stage of the reciprocating compressor, a composition of the gas, an ambient pressure of the reciprocating compressor, a speed of rotation of the reciprocating compressor, and a temperature of a cooling fluid at an inlet and an outlet of the reciprocating compressor cylinders, and

wherein the operating parameters include one or more of a gas flow rate, a delivery pressure of each stage except the last stage of the reciprocating compressor, a delivery temperature at each stage of the reciprocating compressor, a power consumption of the reciprocating compressor and forces acting on the reciprocating compressor and the operating parameters are calculated by the design program based on the measured parameters and the manually entered parameters related to the operating state of the reciprocating compressor.

11. (Previously Presented) The system of claim 10, wherein the processing unit is operable to obtain data from design specifications of the reciprocating compressor and to perform a third comparison between the data from the design specifications and the data measured by the sensors to determine whether there is design conformity with the design specifications.

12. (Previously Presented) The system of claim 11, wherein the processing unit is operable to receive the results of the third comparison as inputs for the design program for the reciprocating compressor, wherein outputs of the design program comprises the operating parameters.

13. (Previously Presented) The system of claim 10, wherein the second database comprises a matrix in which each row represents values of the parameters relating to the operating state of the reciprocating compressor associated with a specific anomaly.

14. (Previously Presented) The method of claim 6, further comprising:  
independently performing the first and second comparisons.

15. (Previously Presented) The method of claim 7, further comprising:  
displaying, based on the third comparison, an indication that at least a parameter of the reciprocating compressor is not compliant with a design specification.

16. (Previously Presented) The system of claim 10, wherein the processing unit is further configured to:  
independently perform the first and second comparisons.

17. (Previously Presented) The system of claim 11, wherein the processing unit is further configured to:

generate a display signal, based on the third comparison, that is indicative that at least a parameter of the reciprocating compressor is not compliant with a design specification.

18. (Currently Amended) A computer readable medium including computer executable instructions, wherein the instructions, when executed, implement a method for monitoring a reciprocating compressor, the method comprising:

reading from sensors, associated with the reciprocating compressor, data corresponding to measured parameters relating to an operating state of the reciprocating compressor;

reading manually entered data corresponding to manually entered parameters relating to the operating state of the reciprocating compressor;

reading from a first database reference parameters relating to the operating state of the reciprocating compressor;

reading operating parameters of the reciprocating compressor that are calculated by a design program;

performing a first comparison by analyzing the reference parameters with respect to ~~between~~ the measured parameters, the manually entered parameters, ~~the reference parameters and~~ the operating parameters;

performing a second comparison by analyzing the reference parameters with

~~respect to between~~ the measured parameters, and the manually entered parameters  
~~and the reference parameters stored in the first database;~~

detecting whether an anomaly exists based on results of the first and second  
comparisons; and

if an anomaly is detected in the first and second comparisons, performing a  
search in a second database to find a match of previously stored data correlated with  
predetermined anomalies and corresponding characteristics of the predetermined  
anomalies, and sending a signal according to the match, the signal indicating  
characteristics of the detected anomaly of the operating state of the reciprocating  
compressor,

wherein the measured parameters and the manually entered parameters related  
to the operating state of the reciprocating compressor include one or more of an intake  
pressure of a first stage of the reciprocating compressor, an intake temperature of each  
stage of the reciprocating compressor, a delivery pressure of a last stage of the  
reciprocating compressor, a composition of the gas, an ambient pressure of the  
reciprocating compressor, a speed of rotation of the reciprocating compressor, and a  
temperature of a cooling fluid at an inlet and an outlet of the reciprocating compressor  
cylinders, and

wherein the operating parameters include one or more of a gas flow rate, a  
delivery pressure of each stage except the last stage of the reciprocating compressor, a  
delivery temperature at each stage of the reciprocating compressor, a power  
consumption of the reciprocating compressor and forces acting on the reciprocating



compressor and the operating parameters are calculated by the design program based on the measured parameters and the manually entered parameters related to the operating state of the reciprocating compressor.

19. (Previously Presented) The medium of claim 18, further comprising:  
obtaining data from design specifications of the reciprocating compressor; and  
performing a third comparison between the data from the design specifications and the data measured by the sensors to determine whether there is design conformity with the design specifications.

20. (Previously Presented) The medium of claim 19, further comprising:  
receiving the results of the third comparison as inputs for the design program for the reciprocating compressor, wherein outputs of this design program comprises the operating parameters.

21. (Previously Presented) The medium of claim 18, wherein the second database comprises a matrix in which each row represents values of the parameters relating to the operating state of the reciprocating compressor associated with a specific anomaly.

22. (Previously Presented) The medium of claim 18, further comprising:  
independently performing the first and second comparisons.

23. (Previously Presented) The medium of claim 19, further comprising:  
displaying, based on the third comparison, an indication that at least a parameter  
of the reciprocating compressor is not compliant with a design specification.